Claims:

1. A method of vaccinating a mammal against a disease state, comprising administrating to said mammal, within an appropriate vector, a nucleotide sequence encoding an antigenic peptide associated with the disease state;

additionally administering to said mammal a compound which enhances both humoral and cellular immune responses initiated by the antigenic peptide, the compound being selected from:

4-(2-formyl-3-hydroxyphenoxymethyl)benzoic acid;
5-(2-formyl-3-hydroxyphenoxy)pentanamide;
N,N-diethyl 5-(2-formyl-3-hydroxyphenoxy)pentanamide;
N-isopropyl 5-(2-formyl-3-hydroxyphenoxy)pentanamide;
ethyl 5-(2-formyl-3-hydroxyphenoxy)pentanoate;
5-(2-formyl-3-hydroxyphenoxy)pentanonitrile;
(±)-5-(2-formyl-3-hydroxyphenoxy)-2-methylpentanoic acid;
5-(2-formyl-3-hydroxyphenoxy)-2,2-dimethylpentanoic acid;
methyl 3-(2-formyl-3-hydroxyphenoxy)methylbenzoate;
3-(2-formyl-3-hydroxyphenoxy)methylbenzoic acid;
benzyl 5-(2-formyl-3-hydroxyphenoxy)pentanoate;
5-[4-(2-formyl-3-hydroxyphenoxy)-N-butyl]tetrazole;
7-(2-formyl-3-hydroxyphenoxy)heptanoic acid;
5-(2-formyl-3-hydroxy-4-n-propoxyphenoxy)pentanoic acid;
5-(4,6-dichloro-2-formyl-3-hydroxyphenoxy)pentanoic acid;
5-(2-formyl-3-hydroxyphenoxy)-N-methylsulphonylpentanamide;
ethyl 4-(2-formyl-3-hydroxyphenoxymethyl)benzoate;
5-(4-chloro-2-formyl-3-hydroxyphenoxy)pentanoic acid;
5-(3-acetylamino-2-formylphenoxy)pentanoic acid;
Aminoguanidine;
4-(2-formyl-3-hydroxyphenoxy)butanoic acid;
6-(2-formyl-3-hydroxyphenoxy)hexanoic acid;
ethyl 4-(3-acetylaminio-2-formylphenoxymethyl)benzoate;
4-(3-acetylamino-2-formylphenoxymethyl)benzoic acid;
2-(2-formyl-3-hydroxyphenoxymethyl)benzoic acid;

5-[4-(2-formyl-3-hydroxyphenoxymethyl)phenyl]tetrazole;
5-(2-formyl-3-hydroxy-4-methoxyphenoxy)pentanoic acid;
3-(2-formyl-3-hydroxyphenoxy)propionitrile;
4-Hydroxyphenylacetaldehyde;
Phenylacetaldehyde;
4-Methoxyphenylacetaldehyde;
1-hydroxy-2-phenylpropane;
3-Phenylproponionaldeyde;
4-Nitrobenzaldehyde;
Methyl 4-formylbenzoate;
4-Chlorobenzaldehyde;
4-Methyloxybenzaldehyde;
4-Methylbenzaldehyde;
8,10-Dioxoundecanoic acid;
4,6-Dioxoheptanoic acid;
Pentanedione;
5-methoxy-1-tetralone;
6-methoxy-1-tetralone;
7-methoxy-1-tetralone;
2-tetralone;
3-hydroxy-1-(4-methoxyphenyl)-3-methyl-2-butanone;
2',4'-dihydroxy-2-(4-methoxyphenyl)acetophenone;
2-hydroxy-1-(4-methyoxyphenyl)-pent-2ene-4one;
Naringenin 4',5,6-trihydroxyflavonone;
4'-methoxy-2-(4-methoxyphenyl)acetophenone;
6,7-dihydroxycoumarin;
7-methoxy-2-tetralone;
6,7-dimethoxy-2-tetralone;
6-hydroxy-4-methylcoumarin;
Homogentisic acid gamma lactone;
6-hydroxy-1,2-naphthoquinone;
8-methoxy-2-tetralone;

and physiologically acceptable salts thereof, where appropriate.

SUB B2 CLAIM 1

Sub D1

2. The method according to claim 1 wherein administration of the compound takes place on between one and seven occasions, between about 14 days prior to and about 14 days post administration of the nucleotide sequence.

3. The method according to claim 1 wherein administration of the compound takes place on between one and seven occasions, between about 7 days prior to and about 7 days post administration of the nucleotide sequence.

4. The method according to claim 1 wherein administration of the compound takes place between about 24 hours prior to and about 24 hours post administration of the nucleotide sequence.

5. The method according to claim 1 wherein administration of the compound is substantially simultaneous with administration of the nucleotide sequence.

A claim 1

6. The method according to ~~any one of claims 1 to 5~~ which is repeated between 1 and 4 times, at intervals of between about 1 day and about 18 months.

A claim 1

7. The method according to ~~any one of claims 1 to 6~~ wherein administration of the nucleotide sequence is via the oral, nasal, pulmonary, intramuscular, subcutaneous or intradermal routes.

8. The method according to claim 7 wherein the nucleotide sequence is administered using a gene-gun delivery technique.

A Sub D2 claim 1

9. The method according to ~~any one of claims 1 to 8~~ wherein administration of the compound is via the oral, nasal, pulmonary, intramuscular, subcutaneous, intradermal or topical routes.

A claim 1

10. The method according to ~~any one of claims 1 to 8~~ wherein the compound is administered using a gene-gun delivery technique.

11. The method according to ~~either claim 9 or claim 10~~ wherein the compound is administered at a dose of between about 0.1mg and about 100 mg/per kg per administration.

12. The method according to ~~any one of claims 1 to 11~~ wherein the mammal is a human.

13. The method according to ~~any one of claims 1 to 12~~ wherein the compound is 4-(2-formyl-3-hydroxyphenoxymethyl)benzoic acid.

14. A vaccine composition comprising a nucleotide sequence which encodes for an antigenic peptide associated with a disease state and which is within an appropriate vector, and a compound which will enhance both humoral and cellular immune responses in a mammal which are initiated by the antigenic peptide, the compound being selected from:

4-(2-formyl-3-hydroxyphenoxymethyl)benzoic acid;
5-(2-formyl-3-hydroxyphenoxy)pentanamide;
N,N-diethyl 5-(2-formyl-3-hydroxyphenoxy)pentanamide;
N-isopropyl 5-(2-formyl-3-hydroxyphenoxy)pentanamide;
ethyl 5-(2-formyl-3-hydroxyphenoxy)pentanoate;
5-(2-formyl-3-hydroxyphenoxy)pentanonitrile;
(±)-5-(2-formyl-3-hydroxyphenoxy)-2-methylpentanoic acid;
5-(2-formyl-3-hydroxyphenoxy)-2,2-dimethylpentanoic acid;
methyl 3-(2-formyl-3-hydroxyphenoxy)methylbenzoate;
3-(2-formyl-3-hydroxyphenoxy)methylbenzoic acid;
benzyl 5-(2-formyl-3-hydroxyphenoxy)pentanoate;
5-[4-(2-formyl-3-hydroxyphenoxy)-N-butyl]tetrazole;
7-(2-formyl-3-hydroxyphenoxy)heptanoic acid;
5-(2-formyl-3-hydroxy-4-n-propoxyphenoxy)pentanoic acid;
5-(4,6-dichloro-2-formyl-3-hydroxyphenoxy)pentanoic acid;
5-(2-formyl-3-hydroxyphenoxy)-N-methylsulphonylpentanamide;
ethyl 4-(2-formyl-3-hydroxyphenoxymethyl)benzoate;
5-(4-chloro-2-formyl-3-hydroxyphenoxy)pentanoic acid;
5-(3-acetylamino-2-formylphenoxy)pentanoic acid;

Aminoguanidine;
4-(2-formyl-3-hydroxyphenoxy)butanoic acid;
6-(2-formyl-3-hydroxyphenoxy)hexanoic acid;
ethyl 4-(3-acetylaminio-2-formylphenoxymethyl)benzoate;
4-(3-acetylamino-2-formylphenoxymethyl)benzoic acid;
2-(2-formyl-3-hydroxyphenoxymethyl)benzoic acid;
5-[4-(2-formyl-3-hydroxyphenoxymethyl)phenyl]tetrazole;
5-(2-formyl-3-hydroxy-4-methoxyphenoxy)pentanoic acid;
3-(2-formyl-3-hydroxyphenoxy)propionitrile;
4-Hydroxyphenylacetaldehyde;
Phenylacetaldehyde;
4-Methoxyphenylacetaldehyde;
1-hydroxy-2-phenylpropane;
3-Phenylproponionaldeyde;
4-Nitrobenzaldehyde;
Methyl 4-formylbenzoate;
4-Chlorobenzaldehyde;
4-Methyloxybenzaldehyde;
4-Methylbenzaldehyde;
8,10-Dioxoundecanoic acid;
4,6-Dioxoheptanoic acid;
Pentanedione;
5-methoxy-1-tetralone;
6-methoxy-1-tetralone;
7-methoxy-1-tetralone;
2-tetralone;
3-hydroxy-1-(4-methoxyphenyl)-3-methyl-2-butanone;
2',4'-dihydroxy-2-(4-methoxyphenyl)acetophenone;
2-hydroxy-1-(4-methyoxyphenyl)-pent-2ene-4one;
Naringenin 4',5,6-trihydroxyflavonone;
4'-methoxy-2-(4-methoxyphenyl)acetophenone;
6,7-dihydroxycoumarin;
7-methoxy-2-tetralone;
6,7-dimethoxy-2-tetralone;
6-hydroxy-4-methylcoumarin;

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Homogentisic acid gamma lactone;
6-hydroxy-1,2-naphthoquinone;
8-methoxy-2-tetralone;

namely and physiologically acceptable salts thereof, where appropriate.

15. The vaccine composition according to claim 14 which is in a form suitable for administration via the oral, nasal, pulmonary, intramuscular, subcutaneous or intradermal route.

16. The vaccine composition according to claim 14 which is in a form suitable for administration using a gene-gun delivery technique.

A

17. The vaccine composition according to ~~any one of claims 14 to 16~~ claim 14 wherein the compound is 4-(2-formyl-3-hydroxyphenoxymethyl)benzoic acid.

18. Use of a compound in the manufacture of a medicament, wherein administration of the compound to a mammal enhances both humoral and cellular responses initiated by an antigenic peptide associated with a disease state, peptide being expressed as a result of administration to said mammal of a nucleotide sequence encoding for the peptide;

SUB C2

wherein said compound is selected from:

4-(2-formyl-3-hydroxyphenoxymethyl)benzoic acid;
5-(2-formyl-3-hydroxyphenoxy)pentanamide;
N,N-diethyl 5-(2-formyl-3-hydroxyphenoxy)pentanamide;
N-isopropyl 5-(2-formyl-3-hydroxyphenoxy)pentanamide;
ethyl 5-(2-formyl-3-hydroxyphenoxy)pentanoate;
5-(2-formyl-3-hydroxyphenoxy)pentanonitrile;
(±)-5-(2-formyl-3-hydroxyphenoxy)-2-methylpentanoic acid;
5-(2-formyl-3-hydroxyphenoxy)-2,2-dimethylpentanoic acid;
methyl 3-(2-formyl-3-hydroxyphenoxy)methylbenzoate;
3-(2-formyl-3-hydroxyphenoxy)methylbenzoic acid;
benzyl 5-(2-formyl-3-hydroxyphenoxy)pentanoate;

5-[4-(2-formyl-3-hydroxyphenoxy)-N-butyl]tetrazole;
7-(2-formyl-3-hydroxyphenoxy)heptanoic acid;
5-(2-formyl-3-hydroxy-4-n-propoxyphenoxy)pentanoic acid;
5-(4,6-dichloro-2-formyl-3-hydroxyphenoxy)pentanoic acid;
5-(2-formyl-3-hydroxyphenoxy)-N-methylsulphonylpentanamide;
ethyl 4-(2-formyl-3-hydroxyphenoxymethyl)benzoate;
5-(4-chloro-2-formyl-3-hydroxyphenoxy)pentanoic acid;
5-(3-acetylamino-2-formylphenoxy)pentanoic acid;
Aminoguanidine;
4-(2-formyl-3-hydroxyphenoxy)butanoic acid;
6-(2-formyl-3-hydroxyphenoxy)hexanoic acid;
ethyl 4-(3-acetylaminio-2-formylphenoxymethyl)benzoate;
4-(3-acetylamino-2-formylphenoxymethyl)benzoic acid;
2-(2-formyl-3-hydroxyphenoxymethyl)benzoic acid;
5-[4-(2-formyl-3-hydroxyphenoxymethyl)phenyl]tetrazole;
5-(2-formyl-3-hydroxy-4-methoxyphenoxy)pentanoic acid;
3-(2-formyl-3-hydroxyphenoxy)propionitrile;
4-Hydroxyphenylacetaldehyde;
Phenylacetaldehyde;
4-Methoxyphenylacetaldehyde;
1-hydroxy-2-phenylpropane;
3-Phenylproponionaldeyde;
4-Nitrobenzaldehyde;
Methyl 4-formylbenzoate;
4-Chlorobenzaldehyde;
4-Methyloxybenzaldehyde;
4-Methylbenzaldehyde;
8,10-Dioxoundecanoic acid;
4,6-Dioxoheptanoic acid;
Pentanedione;
5-methoxy-1-tetralone;
6-methoxy-1-tetralone;
7-methoxy-1-tetralone;
2-tetralone;
3-hydroxy-1-(4-methoxyphenyl)-3-methyl-2-butanone;

SUB C2 Cont

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2',4'-dihydroxy-2-(4-methoxyphenyl)acetophenone;
2-hydroxy-1-(4-methyoxyphenyl)-pent-2ene-4one;
Naringenin 4',5,6-trihydroxyflavonone;
4'-methoxy-2-(4-methoxyphenyl)acetophenone;
6,7-dihydroxycoumarin;
7-methoxy-2-tetralone;
6,7-dimethoxy-2-tetralone;
6-hydroxy-4-methylcoumarin;
Homogentisic acid gamma lactone;
6-hydroxy-1,2-naphthoquinone;
8-methoxy-2-tetralone;

and physiologically acceptable salts thereof, where appropriate.

19. The use according to claim 18 wherein the medicament is in a form suitable for administration via the oral, nasal, pulmonary, intramuscular, subcutaneous or intradermal routes.

20. The use according to claim 19 wherein the medicament is in a form suitable for administration using a gene-gun delivery technique.

A 21 The use according to ~~any one of claims 18 to 20~~ claim 18 wherein the compound is 4-(2-formyl-3-hydroxyphenoxymethyl)benzoic acid.

A 22. The use according to ~~any one of claims 18 to 21~~ claim 18 wherein the compound is administered at a dose of between about 0.1 mg/kg and 100 mg/kg per administration.

A. 23. The use according to ~~anyone of claims 18 to 22~~ claim 18 wherein the medicament further comprises the nucleotide sequence.

SUB C3 24. A combination of components for separate, sequential or concomitant administration in a method according to claim 1, comprising the nucleotide sequence encoding an antigenic peptide and the compound which enhances both cellular and humoral immune responses initiated by the antigenic peptide.